AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listing of claims in the application:

Listing of Claims:

1. (Withdrawn) A system for detecting a cardiac event in a human patient the system including:

at least two electrodes for obtaining an electrical signal from the patient's heart, the electrical signal being either or both an electrogram and/or an electrocardiogram, the electrical signal consisting of a multiplicity of segments each having a time period of a specific time duration;

a device for detecting a cardiac event, the device including means for processing at least some segments of the electrical signal, the means for processing including the processing of individual beats of the patient's heart and also the sequential processing of successive beats to detect at least one abnormality within that beat, the processing being capable of determining if the beat is an abnormal beat or a normal beat; and

means for determining that a cardiac event has occurred when at least M

out of N abnormal beats occur during the processing of the electrical signal

before the occurrence of M-N+1 normal beats.

2. (Withdrawn) The system of claim 1 where the cardiac event is an acute

myocardial infarction.

3. (Withdrawn) The system of claim 1 where the abnormality is a detected ST

shift.

4. (Withdrawn) The system of claim 1 the cardiac event is an arrhythmia.

5. (Withdrawn) The system of claim 4 where the arrhythmia is selected from the

group consisting of tachycardia, bradycardia, unsteady heart rate, bigeminal

rhythm, premature ventricular contractions, premature atrial contractions and atrial

fibrillation.

6. (Withdrawn) The system of claim 1 where the cardiac event is exercise induced

ischemia.

7. (Withdrawn) The system of claim 1 where at least one of the electrodes is located within the heart.

8. (Withdrawn) The system of claim 7 where the electrode located within the heart is located within the right ventricle.

9. (Withdrawn) The system of claim 7 where the electrode located within the heart is located within the right atrium.

10. (Withdrawn) The system of claim 1 where at least one of the electrodes is located outside of the heart.

11. (Withdrawn) The system of claim 1 where at least one electrode is located on the surface of the patient's skin.

12. (Withdrawn) The system of claim 1 where at least one electrode is located subcutaneously.

13. (Withdrawn) The system of claim 12 where at least one subcutaneously located electrode is located on the patient's left side.

14. (Currently Amended) A system for detecting a cardiac event from an

electrogram of a patient's heart as measured by implantable electrodes the

electrogram including segments consisting of multiple beats and each beat having

sub-segments, the system including:

> (a) electrical circuitry means for determining the time of occurrence of the
>
> R waves of successive beats within the electrogram;

> (b) processor means for calculating the time period between successive R
>
> waves, that time period being called an R-R interval, the R-R interval for a
>
> specific beat within the electrogram being the difference in time of
>
> occurrence of the R wave of a first beat to the time of occurrence of the R
>
> wave of the preceding beat;

> (c) means for determining the signal amplitude of at least one sub-segment
>
> of at least one beat of the electrogram, the sub-segment having a start time
>
> and a time duration;

> (d) means for adjusting the start time of the sub-segment responsive to the
>
> calculated R-R interval based upon a look-up table having predetermined
>
> start times associated with specific R-R intervals; and,

(e) processing means for detecting and ~~displaying~~ <u>providing an alert</u> that

the cardiac event has occurred by further analysis of the signal

amplitude of the at least one sub-segment of the at least one beat of the

electrogram.

15. (Previously Presented) The system of claim 14 wherein the cardiac event is an

acute myocardial infarction.

16. (Previously Presented) The system of claim 14 wherein the cardiac event is

exercise induced ischemia.

17. (Previously Presented) The system of claim 14 wherein the sub-segment of

the electrogram includes at least a portion of the ST segment of the electrogram.

18. (Previously Presented) The system of claim 14 wherein the sub-segment of

the electrogram includes at least a portion of the PQ segment of the electrogram.

19. (Previously Presented) The system of claim 14 wherein the sub-segment of

the beat of the electrogram includes the peak of the T wave.

20. (Original) The system of claim 14 further including means to exclude any beat where the R-R interval is shorter than a predetermined time period from the processing means for detecting a cardiac event.

21. (Previously Presented) The system of claim 20 wherein the predetermined time period is 60 milliseconds.

22. (Previously Presented) The system of claim 14 wherein the signal amplitude of the sub-segment is the average signal amplitude of that sub-segment.

23. (Previously Presented) The system of claim 14 wherein the start time of the sub-segment is adjusted in proportion to the R-R interval.

24. (Previously Presented) The system of claim 14 wherein the start time of the sub-segment is adjusted in proportion to the square root of the R-R interval.

25. (Previously Presented) The system of claim 14 wherein the means for adjusting the start time for the sub-segment uses a look-up table with values of start time corresponding to certain values of R-R interval.

26. (Withdrawn) A cardiac pacemaker with the capability of detecting a heart

attack in a human patient the pacemaker including:

electronic demand pacing circuitry designed to pace the heart of the human

patient when the R-R interval exceeds a pre-determined time period;

a pacemaker lead placed within the heart of the patient, the lead providing

an electrogram signal to the electronic demand pacing circuitry;

electronic circuitry for detecting a shift in a specific sub-segment of the

electrogram signal, the electronic circuitry including timing means to

identify the start and time duration of a sub-segment for each beat within

the patient's electrogram signal, the timing means having at least two sets of

parameters used to calculate the start time and duration of the sub-segment,

a first set of parameters for detecting a shift in the specific sub-segment of

the heart beat for heart beats that are not triggered by the electronic demand

pacing circuitry, and a second set of parameters to be used for detecting a

shift in the specific sub-segment of the heart beat for heart beats that are

triggered by the electronic demand pacing.

27. (Withdrawn) The system of claim 26 where the sub-segment is the ST segment.

28. (Withdrawn) The system of claim 26 where the sub-segment includes the peak of the T wave.

29. (Withdrawn) The system of claim 26 where start time of the sub-segment is calculated relative to the time of occurrence of the R wave.

30. (Withdrawn) The system of claim 26 where start time of the sub-segment is calculated relative to the time of occurrence of the S wave.

31. (Withdrawn) The system of claim 26 where start time of the sub-segment is calculated relative to the time of occurrence of the S wave on beats where the pacemaker is pacing and relative to the R wave on beats where the pacemaker is not pacing.

32. (Withdrawn) The system of claim 26 further including alerting means to notify the patient when a heart attack is detected.

33. (Withdrawn) The system of claim 32 further including means to detect exercise induced ischemia and heart arrhythmias.

34. (Withdrawn) A system for detecting a cardiac event in a human patient, the system including:

at least two electrodes implanted in the patient for obtaining the electrical signal from the patient's heart, the electrical signal being an electrogram;

an implanted cardiosaver including electronic circuitry designed to identify at least one feature of a beat of the electrogram by comparing the slope of the electrogram signal with a first predetermined threshold if the slope of the electrogram signal is positive and a second predetermined threshold if the slope of the electrogram signal is negative.

35. (Withdrawn) The system of claim 34 where the electronic circuitry includes a microprocessor.

36. (New) A system for assessing cardiac function based on the electrical signal

from a patient's heart as measured by implantable electrodes, the electrical signal

including segments consisting of multiple beats, the time period between QRS

fiducial points of successive beats being called an R-R interval, the system

including:

(a) means for receiving a first plurality of user selected offset times

associated with a corresponding plurality of R-R intervals;

(b) electrical circuitry means for determining R-R intervals;

(c) processor means for determining a first particular offset time relative to

a beat fiducial point of one beat of the electrical signal, wherein the first

particular offset time is a function of an R-R interval associated with the

one beat, and wherein the first particular time offset is based on at least one

of the first plurality of user selected offset times; and

(d) processing means for assessing cardiac function based upon the

amplitude of the electrical signal at a sample defined by the beat fiducial

point and the first particular time offset.

37. (New) The system of claim 36 wherein the QRS fiducial points are R wave peaks.

38. (New) The system of claim 36 wherein the beat fiducial point is within a QRS complex.

39. (New) The system of claim 38 wherein the beat fiducial point is an R wave peak.

40. (New) The system of claim 36 wherein the sample defined by the beat fiducial point and the first particular time offset is within an ST segment.

41. (New) The system of claim 36 wherein each of the first plurality of user selected offset times is associated with a corresponding range of R-R intervals.

42. (New) The system of claim 36 wherein the first particular offset time is based on only one of the first plurality of user selected offset times that corresponds to the R-R interval associated with the one beat.

43. (New) The system of claim 42 wherein the first particular offset time is equal

to the one of the first plurality of user selected offset times that corresponds to the

R-R interval associated with the one beat.

44. (New) The system of claim 36 wherein the system includes:

(e) means for receiving a second plurality of user selected offset times

associated with a corresponding plurality of R-R intervals;

(f) means for determining a second particular offset time relative to the beat

fiducial point, wherein the second particular offset time is a function of the

R-R interval associated with the one beat, and wherein the second particular

time offset is based on at least one of the second plurality of user selected

offset times; and

(g) processing means for assessing cardiac function based upon the

amplitude of the electrical signal at samples defined by the beat fiducial

point and the first and second particular time offsets.

45. (New) The system of claim 44 wherein the first particular offset time is associated with the start of a subsegment of the electrical signal, and wherein the second particular offset time is associated with the end of the subsegment.

46. (New) The system of claim 45 wherein each of the first plurality of user selected offset times corresponds to the subsegment start time, and wherein each of the second plurality of user selected offset times corresponds to the subsegment duration.